Abstract

Nowadays solid phase extraction based on magnetic nanoparticles (MNPs) have been developed, therefore we report on the synthesis of dopamine loaded magnetic nanoparticles for new, simple, fast and repeatable extraction of ochratoxin A. To this end, Fe_3O_4 nanoparticles (NPs) were synthesized using thermal decomposition reaction and dopamine was then conjugated with Fe_3O_4 nanoparticles (NPs) to form Fe_3O_4-DPA NPs. Dynamic light scattering, field emission scanning electron microscopy and transmission electron microscopy showed an average size about 15 nm for Fe_3O_4-DPA NPs. Also, zeta potential measurement and vibrating sample magnetometer confirmed positively charged (16.8 mV) and superparamagnetic behavior of MNPs that are effective factors for a good adsorbent in the extraction. In this article, we focused on the ability of Fe_3O_4-DPA NPs in the extraction of ochratoxin A from different solvents. Identifying of ochratoxin A was performed using both HPLC with fluorescence detector and fluorescence spectroscopy. Various solvents and different effective parameters were measured until acetonitrile: methanol (80:20 V/V) was selected as the best extraction solvent and acetonitrile: water: acetic acid (99:99:2 V/V/V) was selected as the best desorption solvent. Also, based on the pH-partition theory, with pH changes, we were able to increase and improve the extraction rate to 94%. Via fluorescence spectroscopy and decrease in fluorescence intensity of ochratoxin A after extraction, the Fe_3O_4-DPA NPs capability to creation an acceptable interaction with ochratoxin A was confirmed.

***Keywords*:** Ochratoxin A; Magnetic nanparticles; HPLC; Solid phase extraction; Fluorescence spectroscopy

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Synthesis of magnetic nanoparticles containing dopamine and their use in extraction of ochratoxin

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